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ABSTRACT

Instructors can use this inventory to prepare high school equivalency students for the reading skills test of the new form of the Test of General Educational Development (GED). It replaces the instrument previously recommended for that purpose, the Iowa Tests of Educational Development (ITED). Fifty-two multiple choice questions test the ability to interpret seventeen reading passages, illustrations, charts, or tables. An answer key and sheets for recording student responses are included. The skills needed to answer each question are identified, such as reading chemical formulas, inferring scientific generalizations, or identifying emphasis. After a student's responses are evaluated, the instructor should note any skill weaknesses and prescribe instruction using the designated card from the companion volume, A Taxonomy of Selected High School Equivalency Materials (Reading), ED 114 766. This Taxonomy is keyed to three New York State Education Department publications and six commercially available programs that can be used to introduce and reinforce specific skills which the student has not mastered. The materials range in difficulty from a seventh grade to a twelfth-fourteenth grade reading level. (CP)

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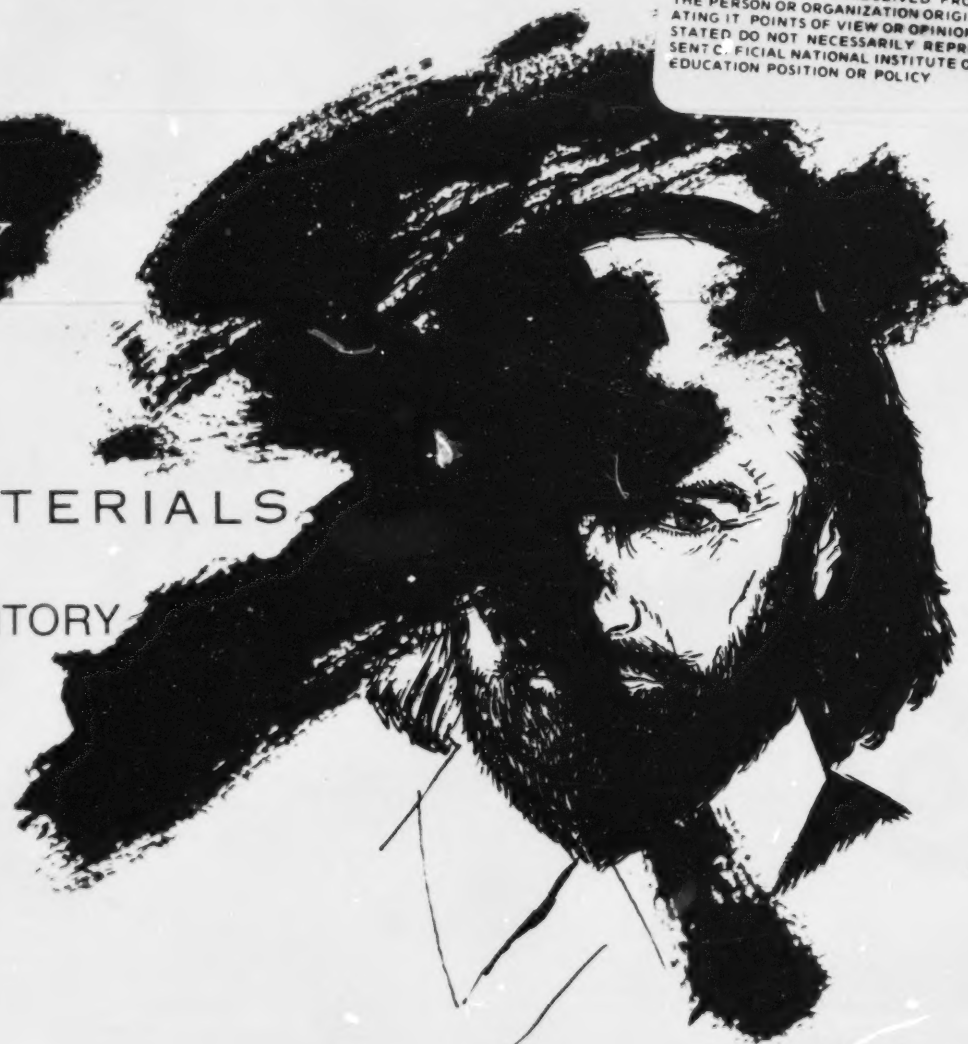
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*A TAXONOMY OF SELECTED
HIGH SCHOOL EQUIVALENCY
MATERIALS*

READING SCIENCE MATERIALS

SUPPLEMENTARY INVENTORY



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ALBANY, NEW YORK 12234

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FOREWORD

In 1976, A Taxonomy of Selected High School Equivalency Materials (Reading), was distributed to Directors of Continuing Education throughout the State. In that Taxonomy, the Iowa Tests of Educational Development (I.T.E.D.), X-4 and Y-4, were recommended as instruments which could be used to profile a student's competencies in the reading skills which needed to be mastered as a requisite to passing the Tests of General Educational Development. However, the I.T.E.D. was really not designed specifically for that purpose. While it tests for most of the skills which are on the G.E.D., it fails to test in several critical areas. The I.T.E.D. was recommended though because, of all the instruments available at the time, it represented the highest correlation between the skills assessed and the skills which need to be mastered by a high school equivalency student.

The recommendation to use the I.T.E.D. was only an expediency so that the development of the Taxonomy should not be delayed by the time-consuming task of constructing an assessment instrument. This supplement, tailored to the skills tested for on the *reading skills test of the new form of the G.E.D.*, now provides the high school equivalency instructor with a means of assessing these skills. Experienced high school equivalency instructors will notice that there is considerable overlap with the skills identified in the "Interpreting Reading Material in Science" section of Developing High School Equivalency Reading Skills. However, it will also be noticed that some skills have been omitted, some added, and some modified. Therefore, while the Taxonomy is still a valuable reference tool, its use in preparing students to take the new form of the G.E.D. will require some flexibility on the part of the instructors. It should also be noted that this particular supplement inventories only skills required for reading science-related material. Two additional supplements are under development; one to inventory skills of reading social studies material, and the other skills of reading literature.

For ease of scoring, the students should record their responses on copies of the multiple choice answer sheets found on pages 1 and 2. The correct answers are found on pages 3 and 4. Once a student's responses are evaluated, the instructor should take note of any skill weaknesses and prescribe instruction using the designated card (cd) from the Taxonomy if applicable. A sample is found on page 5. If the skill is new and not indexed in the Taxonomy, the instructor will have to devise appropriate alternatives.

The Inventory was constructed by Francis Loeffler, Washington Irving Education Center, Schenectady and Evelyn A. Donahue, Hadley Luzerne Central Schools. It was reviewed by Gerald Cerne, South Colonie Central Schools. George K. Tregaskis, associate, Bureau of General Education Curriculum Development coordinated the development of the publication and Theodore Turone, associate, Bureau of General Continuing Education contributed helpful suggestions during the initial planning stages.

Name _____

- | | | | |
|-------------------------|--|-------------------------|---|
| 1) A__ B__ C__ D__ E__ | <i>Using roots and affixes in technical terms (Sc 1)</i> | 17) A__ B__ C__ D__ E__ | <i>Identifying the main idea (Sc 5)</i> |
| 2) A__ B__ C__ D__ E__ | <i>Reading technical vocabulary (Sc 4)</i> | 18) A__ B__ C__ D__ E__ | <i>Reading diagrams (Sc 12)</i> |
| 3) A__ B__ C__ D__ E__ | <i>Inferring the main idea (Sc 6)</i> | 19) A__ B__ C__ D__ E__ | <i>Relating details to the main idea (Sc 7)</i> |
| 4) A__ B__ C__ D__ E__ | <i>Inferring scientific generalizations (Sc 11)</i> | 20) A__ B__ C__ D__ E__ | <i>Inferring scientific generalizations (Sc 11)</i> |
| 5) A__ B__ C__ D__ E__ | <i>Relating details to main idea (Sc 7)</i> | 21) A__ B__ C__ D__ E__ | <i>Reading chemical formulas (Sc 15)</i> |
| 6) A__ B__ C__ D__ E__ | <i>Reading technical vocabulary (Sc 4)</i> | 22) A__ B__ C__ D__ E__ | <i>Reading technical vocabulary (Sc 4)</i> |
| 7) A__ B__ C__ D__ E__ | <i>Inferring scientific generalizations (Sc 11)</i> | 23) A__ B__ C__ D__ E__ | <i>Reading technical vocabulary (Sc 4)</i> |
| 8) A__ B__ C__ D__ E__ | <i>Inferring the main idea (Sc 6)</i> | 24) A__ B__ C__ D__ E__ | <i>Reading technical vocabulary (Sc 4)</i> |
| 9) A__ B__ C__ D__ E__ | <i>Using context clues (Sc 2)</i> | 25) A__ B__ C__ D__ E__ | <i>Identifying basis for organization (Sc 10)</i> |
| 10) A__ B__ C__ D__ E__ | <i>Using context clues (Sc 2)</i> | 26) A__ B__ C__ D__ E__ | <i>Identifying emphases (Sc 9)</i> |
| 11) A__ B__ C__ D__ E__ | <i>Relating details to details (Sc 8)</i> | 27) A__ B__ C__ D__ E__ | <i>Using background knowledge in science</i> |
| 12) A__ B__ C__ D__ E__ | <i>General vocabulary used in special sense (Sc 3)</i> | 28) A__ B__ C__ D__ E__ | <i>Inferring scientific generalizations (Sc 11)</i> |
| 13) A__ B__ C__ D__ E__ | <i>Using roots and affixes in technical terms (Sc 1)</i> | 29) A__ B__ C__ D__ E__ | <i>Identifying basis for organization (Sc 10)</i> |
| 14) A__ B__ C__ D__ E__ | <i>Reading chemical formulas and terminology (Sc 15)</i> | 30) A__ B__ C__ D__ E__ | <i>Identifying emphases (Sc 9)</i> |
| 15) A__ B__ C__ D__ E__ | <i>Using background knowledge in science</i> | 31) A__ B__ C__ D__ E__ | <i>Inferring the main idea (Sc 6)</i> |
| 16) A__ B__ C__ D__ E__ | <i>Using background knowledge in science</i> | 32) A__ B__ C__ D__ E__ | <i>Reading technical vocabulary (Sc 4)</i> |

Name _____

- 33) A__ B__ C__ D__ E__ *Identifying emphases (Sc 9)*
- 34) A__ B__ C__ D__ E__ *Reading technical vocabulary (Sc 4)*
- 35) A__ B__ C__ D__ E__ *Inferring the main idea (Sc 6)*
- 36) A__ B__ C__ D__ E__ *Reading tables (Sc 14)*
- 37) A__ B__ C__ D__ E__ *Reading chemical formulas (Sc 15)*
- 38) A__ B__ C__ D__ E__ *Reading chemical formulas (Sc 15)*
- 39) A__ B__ C__ D__ E__ *Reading chemical formulas (Sc 15)*
- 40) A__ B__ C__ D__ E__ *Identifying emphases (Sc 9)*
- 41) A__ B__ C__ D__ E__ *Inferring scientific generalizations (Sc 11)*
- 42) A__ B__ C__ D__ E__ *Using roots and affixes technical terms (Sc 1)*
- 43) A__ B__ C__ D__ E__ *Inferring the main idea (Sc 6)*
- 44) A__ B__ C__ D__ E__ *Reading tables (Sc 14)*
- 45) A__ B__ C__ D__ E__ *Reading tables (Sc 14)*
- 46) A__ B__ C__ D__ E__ *Reading tables (Sc 14)*
- 47) A__ B__ C__ D__ E__ *Interpreting diagrams (Sc 12)*
- 48) A__ B__ C__ D__ E__ *Interpreting diagrams (Sc 12)*
- 49) A__ B__ C__ D__ E__ *Interpreting diagrams (Sc 12)*
- 50) A__ B__ C__ D__ E__ *Interpreting graphs (Sc 13)*
- 51) A__ B__ C__ D__ E__ *Interpreting graphs (Sc 13)*
- 52) A__ B__ C__ D__ E__ *Interpreting graphs (Sc 13)*

Name _____

- 1) A__ B__ C✓ D__ E__ *Using roots and affixes in technical terms (Sc 1)*
- 2) A__ B__ C__ D✓ E__ *Reading technical vocabulary (Sc 4)*
- 3) A__ B__ C✓ D__ E__ *Inferring the main idea (Sc 6)*
- 4) A__ B__ C__ D__ E✓ *Inferring scientific generalizations (Sc 11)*
- 5) A__ B__ C__ D✓ E__ *Relating details to main idea (Sc 7)*
- 6) A__ B__ C✓ D__ E__ *Reading technical vocabulary (Sc 4)*
- 7) A✓ B__ C__ D__ E__ *Inferring scientific generalizations (Sc 11)*
- 8) A✓ B__ C__ D__ E__ *Inferring the main idea (Sc 6)*
- 9) A__ B__ C✓ D__ E__ *Using context clues (Sc 2)*
- 10) A__ B✓ C__ D__ E__ *Using context clues (Sc 2)*
- 11) A__ B__ C__ D✓ E__ *Relating details to details (Sc 8)*
- 12) A__ B__ C✓ D__ E__ *General vocabulary used in special sense (Sc 3)*
- 13) A✓ B__ C__ D__ E__ *Using roots and affixes in technical terms (Sc 1)*
- 14) A__ B__ C✓ D__ E__ *Reading chemical formulas and terminology (Sc 15)*
- 15) A__ B__ C__ D__ E✓ *Using background knowledge in science*
- 16) A__ B✓ C__ D__ E__ *Using background knowledge in science*
- 17) A__ B__ C✓ D__ E__ *Identifying the main idea (Sc 5)*
- 18) A✓ B__ C__ D__ E__ *Reading diagrams (Sc 12)*
- 19) A__ B__ C__ D__ E✓ *Relating details to the main idea (Sc 7)*
- 20) A✓ B__ C__ D__ E__ *Inferring scientific generalizations (Sc 11)*
- 21) A__ B__ C✓ D__ E__ *Reading chemical formulas (Sc 15)*
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- 32) A__ B__ C✓ D__ E__ *Reading technical vocabulary (Sc 4)*

Name _____

33) A__ B✓ C__ D__ E__ *Identifying emphases (Sc 9)*

34) A__ B__ C__ D✓ E__ *Reading technical vocabulary (Sc 4)*

35) A__ B✓ C__ D__ E__ *Inferring the main idea (Sc 6)*

36) A__ B__ C__ D✓ E__ *Reading tables (Sc 14)*

37) A__ B__ C__ D✓ E__ *Reading chemical formulas (Sc 15)*

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39) A__ B__ C✓ D__ E__ *Reading chemical formulas (Sc 15)*

40) A__ B__ C__ D✓ E__ *Identifying emphases (Sc 9)*

41) A__ B__ C__ D__ E✓ *Inferring scientific generalizations (Sc 11)*

42) A__ B__ C✓ D__ E__ *Using roots and affixes found in technical terms (Sc 1)*

43) A__ B__ C✓ D__ E__ *Inferring the main idea (Sc 6)*

44) A__ B✓ C__ D__ E__ *Reading tables (Sc 14)*

45) A✓ B__ C__ D__ E__ *Reading tables (Sc 14)*

46) A__ B__ C__ D✓ E__ *Reading tables (Sc 14)*

47) A__ B✓ C__ D__ E__ *Interpreting diagrams (Sc 12)*

48) A__ B__ C__ D✓ E__ *Interpreting diagrams (Sc 12)*

49) A__ B__ C✓ D__ E__ *Interpreting diagrams (Sc 12)*

50) A__ B__ C__ D✓ E__ *Interpreting graphs (Sc 13)*

51) A__ B✓ C__ D__ E__ *Interpreting graphs (Sc 13)*

52) A__ B__ C✓ D__ E__ *Interpreting graphs (Sc 13)*

Instruction

*Developing High School Equivalency
Reading Skills (NYSED, 1972) pp. 76-77*

Lower level reinforcement

*High School Equivalency, Book 1,
Interpretation of Reading
Materials (Learning Technology
Inc., 1970)
Frame 104¹
Frame 108
Frame 110
Frame 112^{2,3}
Frame 144*

*High School Equivalency
Examinations in Social
Studies, Science, and
Literature, Your Future is
Now (Barron's Educational
Series, Inc., 1972)
pp. 87-94*
pp. 96-97, X¹⁸; 97
pp. 98-106, I-IX*
pp. 114-115, V^{3,4}; 114-115
pp. 123-124, II^{1,2}; 123-124
pp. 137-138, VII⁴; 138
pp. 254-255, IV¹⁰; 257
pp. 264-266, I¹; 265
pp. 266-267*
pp. 271-272, VIII¹⁴; 272
pp. 302-303, I²; 312*

Upper level reinforcement

*Interpretation of Reading Materials
in the Natural Sciences (Cambridge,
1973)
p. 41¹; 41
pp. 42-43¹; 43
p. 45¹; 46
pp. 77-79⁶; 86*

*Reading Interpretation in Social
Studies, Natural Sciences and
Literature (Simon and Schuster,
1971)
pp. 41-42¹
pp. 53-54²
p. 55² (test 23)
pp. 56-57²*

GED test simulation

*Extending High
School Equivalency
Reading Skills,
Part 2 — Science,
Social Studies,
Mathematics (NYSED,
1973)
pp. 20-21, S¹²*

THE MERCURY CRISIS

As the mercury crisis has disappeared from the headlines, earlier control measures seem to have been forgotten or deliberately overlooked. Most California fish markets sell swordfish containing higher than permissible levels of mercury. The government has moved with only limited success against the use of agricultural fungicides containing mercury. In March 1976, the Environmental Protection Agency backed off from banning use of such fungicides in paints. Part of their reason was that the three manufacturers involved said that the ban would cost the jobs of forty employees and wipe out expected sales of \$4 million in 1976.

Should the stringent controls on all sources of mercury pollution be strictly enforced? Perhaps, but many scientists suspect that mercury already in the water supply will remain a threat for years to come. The reason is that when "inorganic" mercury salts enter a lake or river, they sink to the bottom. There they are slowly converted by microbial action into the "organic" methyl mercury form which killed scores of Japanese twenty years ago and poisoned the Quebec Indians last year. Once converted to the organic methyl mercury form, the poisons move up the food chain from phytoplankton to fish to man. With the 200,000 pounds of mercury now resting on the bottom of Lake St. Clair, that could mean that microbes will be producing methyl mercury for the next 5000 years.

1. The suffix *-cide* means related to
 - a. farming
 - b. mercury
 - c. killing
 - d. seafood
 - e. chemical
2. The term "organic" refers to compounds that are
 - a. safe
 - b. part of the natural structure of fish
 - c. dangerous
 - d. produced by living things
 - e. an artificial substance

3. The main idea of this selection is that
- a. the mercury crisis is no longer a threat to human life
 - b. mercury poisoning can cause death, insanity, or neurological problems
 - c. although less attention is paid to it, the mercury crisis still exists
 - d. U.S. agencies are vigilant in their attempts to control the mercury problem
 - e. Indians in Quebec show signs of mercury poisoning
4. It can be inferred from this passage that
- a. water supplies in the world will "manufacture" dangerous chemicals
 - b. inorganic forms of a potentially dangerous substance can be added to the water supply with little ill-effects
 - c. mercury-poisoning is the result of a naturally caused imbalance in fish
 - d. removing mercury from a water supply is a simple chemical process
 - e. tampering with any element in the food chain can have far-reaching effects
5. Inorganic mercury salts are converted to organic methyl mercury by the action of
- a. fish
 - b. man
 - c. fungicides
 - d. microscopic organisms
 - e. Quebec Indians

OIL SPILLS

Oil contains substances that are highly and lastingly toxic. Added suddenly to existing stresses in the ocean, these substances literally sterilize the affected area. Unseen by surface observers, they can change the composition of aquatic communities and imperil the ability of certain organisms to survive. Their interference with vital life processes that affect behavior are well known.

Floating oil destroys phytoplankton, the algae that generate most of the earth's oxygen. "Destroy phytoplankton," explains Professor Jacques Piccard, the noted deep sea explorer, "and the entire marine cycle is fatally disrupted."

Oil distillates such as kerosene and gasoline are as hazardous as oil in the sea. Instead of floating, they sink rapidly to the bottom, killing as they go. For all their potential destructiveness, however, tanker spills and offshore accidents account for only a fraction of the oil and other hazardous materials in our oceans.

According to a study by the Academy of Sciences, tanker *accidents* (as opposed to intentional — and illegal — bilge cleaning, de-ballasting, and tank pumping) in fact account for only 4 percent of the 50 million barrels of oil introduced into U.S. waters each year. Spills from offshore platforms add up to an even smaller fraction (2 percent). Of the thousands of wells drilled off our coasts since the 1940's, only four blowouts were classified as "major."

By far, the majority of pollution — more than 90 percent — originates from sources that never make headlines. Sea floors naturally seep oil, and, oozing unchecked for eons, account for some 10 percent of "spilled" oil. River runoffs, contribute another 25 percent. Municipal waste, industrial discharges, and rain-borne materials add 10 percent each.

It is the *accumulated total* of these "drip by drip" pollutants, added to the 13,000 accidental (and mostly preventable) spills big and small each year, that creates such staggering problems.

6. The term toxic means:

- a. primitive
- b. sterilized
- c. poisonous
- d. preventable
- e. vital

7. It can be inferred from this passage that

- a. interfering with a natural cycle can have staggering effects upon it
- b. oil well blowouts are the greatest cause of water pollution
- c. the only causes of oil pollution are man-made
- d. big business is the only cause of pollution
- e. oil is the only substance to significantly endanger marine life

8. Which statement most nearly expresses the main idea of this passage?

- a. Pollution from oil comes from many sources
- b. Oil contains substances that are highly and lastingly toxic
- c. An oil tanker's spill is a catastrophic event
- d. Floating oil destroys phytoplankton
- e. Tanker accidents account for 4 percent of the oil introduced in U.S. waters each year

9. Phytoplankton may be described as

- a. a scum of oil on water
- b. a process of producing sea organisms
- c. oxygen-producing algae
- d. oil distillates which produce oxygen
- e. a marine cycle

TOOTH DECAY

Tooth decay, or dental caries, should be recognized for what it is — an infection in the mouth, which is painful and expensive, but can be largely prevented.

A tremendous number of bacteria are present in the mouth at all times. If a person does not clear food residues after eating, or if he/she allows products containing sugar to remain in the mouth for long periods of time, certain types of germs form deposits on the tooth surfaces. These deposits are known as plaque.

When highly soluble and fermentable foods, such as sugar and other carbohydrates are acted upon by bacteria in the mouth, acids are formed. These acids may then dissolve the enamel of the tooth and begin its breakdown. Research findings indicate that acids form within 5 minutes after sweet foods are eaten. Harmful acid levels build up within 15 minutes.

The acid continues to form as long as food is present. Foods that tend to cling to teeth, packing into the grooves are harmful. Several studies in animals have suggested that tooth decay is related to the frequency of between meal eating, especially of sugary and sticky foods.

10. "Plaque" can be defined as
 - a. food residue in the mouth
 - b. sticky bacterial deposits on teeth
 - c. tooth enamel
 - d. a sheltered area between teeth
 - e. food sugars
11. Researchers believe tooth decay is related to frequency of between meal eating since
 - a. acids form as food is acted upon by bacteria
 - b. acids keep forming as long as food particles are present
 - c. snack foods cling to teeth since they are often sugary and sticky
 - d. all of the above
 - e. the stomach is not allowed to rest

THE INTERIOR OF THE EARTH

The center of the earth lies nearly 4,000 miles beneath our feet. The nature of the interior is known only from indirect evidence. From such evidence as minerals and magnetic fields, scientists have deduced that the earth has a heavy core surrounded by concentric layers. The three main parts of the earth are: the crust, which is a thin surface skin; the mantle, which extends from the crust; and the core. The crust makes up less than 1% of the earth by volume and about .4 of 1% by weight. The mantle is 64% by volume and 67% by weight, and the core 15% by volume and 32% by weight.

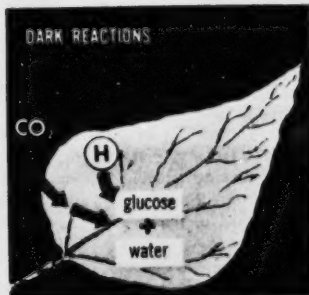
12. The earth science term "core" is similar to the familiar definition of "core" in that both definitions refer to
- a. a concentric layer of matter
 - b. a thin surface skin
 - c. the center of an object
 - d. the pulp of a fruit
 - e. specific gravity or "weight"

PHOTOSYNTHESIS

Photosynthesis, simply stated, is the conversion of two low-energy inorganic compounds, carbon dioxide from the air and water from the soil, into one high-energy organic compound, simple sugar. Radiant energy from the sun provides the outside force to drive the process. The chemical conversion occurs when the green leaf pigment chlorophyll absorbs sunlight and passes the energy on to food-forming enzymes in the cell. Some of the sugar is burned to supply energy for life processes, some is built up into more complex molecules used in growth, and the remainder is stored for later use.

Although the process may sound simple, photosynthesis is really a complex series of reactions not fully understood. We know that the chlorophyll is "activated" or "excited" by the light rays striking it. About 85% of the light so striking a chloroplast is absorbed, thus making it a very efficient engine. In this energized state, a chlorophyll molecule is able to split a molecule of water into its component hydrogen and oxygen atoms. The oxygen is released from the leaf as a by-product gas. Meanwhile, the hydrogen is joined, through a series of intermediary compounds and enzyme reactions, to the carbon dioxide, to yield an energy-rich carbohydrate; that is, a compound containing carbon, hydrogen, and oxygen.

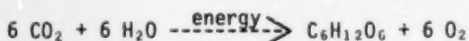
The primary product of photosynthesis is a simple 6-carbon-atom sugar, glucose. The chemical energy thus stored in the sugar molecule can now be used to do work by means of the slow oxidation of the molecule, that is, by burning it enzymatically with oxygen to release its stored energy. This latter process, just the opposite of photosynthesis, we term respiration. Actually, a leaf cell respires at all times in order to get the energy required for its life processes; during the daylight hours, of course, it makes much more glucose than it burns, hence the excess to support growth elsewhere in the plant.



13. Since radiant energy from the sun causes photosynthesis to occur, it is appropriate that the affix "photo" means

- a. light
- b. enzyme
- c. chemical conversion
- d. energy
- e. absorb

14. A simple equation for the photosynthetic process is:



One oxygen molecule contains

- a. zero atoms
- b. 6 atoms
- c. 2 atoms
- d. 12 atoms
- e. insufficient information is given to answer question

15. Which of the following statements concerning photosynthesis is true?

- a. Chlorophyll is needed to absorb sunlight.
- b. Plants and animals supply each other's needs and keep our environment in balance.
- c. Plant cells that contain chlorophyll are able to carry on photosynthesis.
- d. Light is essential for the process of photosynthesis.
- e. All of the above

16. Chlorophyll is found in special structures called

- a. protoplasts
- b. chloroplasts
- c. stomata
- d. compounds
- e. enzymes

17. The main point of the second paragraph of the passage is
- a. photosynthesis is the conversion of two low energy compounds into one high energy compound
 - b. a chlorophyll molecule can split a molecule of water into hydrogen and oxygen
 - c. photosynthesis is a complex series of reactions not fully understood
 - d. 85% of the light striking a chloroplast is absorbed
 - e. none of the above
18. In the diagram of photosynthesis, it can be seen that
- a. chlorophyll molecules are activated by sunlight
 - b. the chlorophyll molecule splits into hydrogen (H) and oxygen (O_2)
 - c. both a and b
 - d. enzymes are created by the breakdown of sugar
 - e. none of the above
19. Which is necessary for the photosynthesis process to occur in plants?
- a. sunlight and magnesium
 - b. carbon dioxide and water-soluble magnesium
 - c. chlorophyll and potassium
 - d. magnesium
 - e. sunlight, carbon dioxide, water, chlorophyll

BUILDING BLOCKS OF MATTER

All matter on earth is composed of one or more elements. If we take a piece of any element, for example gold, and imagine it to be split into smaller and smaller pieces, the smallest piece we could obtain is an atom of gold. Any one atom of gold is the same as any other atom of that element. Thus, the atom carries the distinct properties of that element. Some properties of gold are that it is soft, it is yellow, and it is a metal.

If we take a piece of the element aluminum and break that down, eventually we would obtain atoms of aluminum (Al), and they would be different from the atoms of gold (Au).

20. From this passage the following generalization can be made by the reader.
- Every element has its own kind of atoms, which are identical but they are different from atoms of another element.
 - The atoms of a particular element may differ from one another.
 - The smallest piece of an atom is called an element.
 - None of the above.
 - Gold is a more valuable element than aluminum.
21. The chemical symbol for gold is
- Fe
 - Ag
 - Au
 - Ca
 - Al

SATURN

Saturn is the second largest planet. It is nearly ten times the earth's diameter and 95 times its mass. It rotates on its axis in just 10 hours, slightly slower than Jupiter. Saturn's average density is less than that of water; it is one of the least dense planets in the solar system. There is evidence that Saturn, like Jupiter, consists mostly of hydrogen and helium. Methane is also detectable in Saturn's atmosphere, but ammonia appears to be absent. Saturn's cloud layer forms a banded pattern like that of Jupiter, but the contrasts and colors are much less marked.

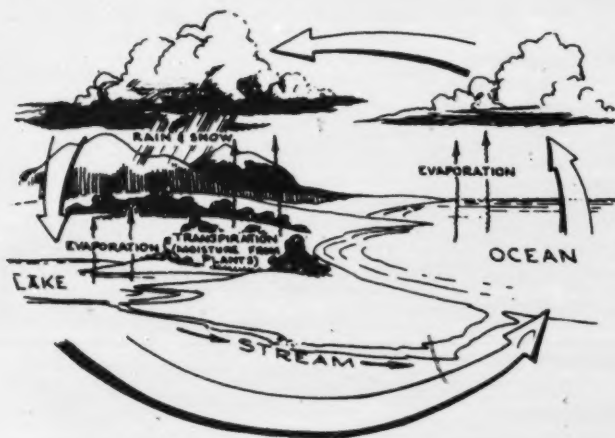
22. The author of this passage is most likely
 - a. a botanist
 - b. a philosopher
 - c. a chemist
 - d. an astronomer
 - e. an agronomist
23. Methane, hydrogen, and ammonia under conditions of standard temperature and pressure are
 - a. liquids
 - b. gases
 - c. cloud layers
 - d. solids
 - e. none of the above
24. Density can be described as
 - a. an important chemical property of matter
 - b. a term giving us a means of comparing the weights of equal volumes of different substances
 - c. a term relating the weight (mass) of a unit volume of matter
 - d. both b and c
 - e. both a and c
25. The author of this passage has organized the information by
 - a. comparison/contrast
 - b. sequence
 - c. structure and function
 - d. chronological order
 - e. cause - effect

QUESTIONS ABOUT THE OCEANS

The oceans are the vast reservoir from which moisture is drawn to furnish precipitation to the land. Even inland areas, such as the Missouri-Mississippi drainage area, receive up to 90 percent of their precipitation from water that has evaporated from the sea surface.

It has been estimated that about 9,000 cubic miles of water fall on the land surface of the earth each year. This water dissolves minerals from the earth and carries them, along with sediments, to the ocean.

Rain water may return to the ocean directly through streams or rivers or more slowly through subsurface percolation. Part of the water may be withdrawn for extended periods by being locked up as ice, and some evaporates back to the atmosphere and falls again as rain or snow.



26. The emphasis of the illustration is best expressed by the following statement.
- The process by which we get water can be described as a cycle.
 - All rain water returns to the ocean eventually.
 - Water dissolves minerals from the earth and carries them from the sea.
 - Transpiration is evaporation of plant moisture.
 - Mountains generally receive more rain than oceans.

27. The energy that drives the water cycle comes from
- a. the sun
 - b. earth's rotation
 - c. plants
 - d. both a and b
 - e. thermal currents
28. All of the following generalizations are useful in understanding the movement of water except
- a. the ocean receives rain water by direct and indirect means
 - b. water evaporated from the ocean supplies little land precipitation
 - c. the essence of this cycle is a progressive transformation and movement of water from the ocean
 - d. as clouds rise to go over mountains they cool
 - e. all of the above

HOW WEATHER IS MADE

Weather is the result of interaction between temperature, pressure, moisture, wind and the number and type of small particles in the atmosphere. Basically, the change in temperature has the most effect. However, it is the change in one or more of the other variables that causes the temperature change which in turn feeds back to modify some of the other variables.

29. The author organized his ideas according to a pattern of
- a. sequence
 - b. definition
 - c. comparison and contrast
 - d. cause and effect
 - e. simplicity - complexity

FOUR MINUTES TO LIVE...THIS MANEUVER CAN SAVE YOU

Often confused with a stroke or a heart attack (which is why it is sometimes called a "Cafe Coronary"), choking on food or some other foreign object is an almost totally unnecessary way to die, in the opinion of Dr. Henry J. Heimlich, a Cincinnati surgeon who specializes in diseases of the esophagus. After a considerable amount of research, Dr. Heimlich devised a relatively simple method for rescuing food-choking victims that has saved as many as 500 lives since its introduction in 1974. It has also received some criticism because, performed improperly, it can cause internal injuries.

To perform the so-called Heimlich Maneuver with the victim standing or sitting, the rescuer (who will be male for grammatical simplicity) stands behind the victim (or the victim's chair) and wraps his arms about the victim's waist. With the thumb side of his fist placed slightly above the victim's navel and slightly below the rib cage, the rescuer grabs his own fist with his other hand and presses into the victim's abdomen with a quick upward thrust, repeating the process several times if necessary. With the victim lying on his back, the rescuer faces the victim and kneels astride his hips. With hand on top of the other, the rescuer places the heel of his bottom hand slightly above the navel, slightly below the rib cage and, again, delivers one or more quick upward thrusts to the victim's abdomen. If alone, a victim may perform the Heimlich Maneuver on himself.

In each instance, the pressure that the rescuer places on the victim's diaphragm causes air in the lungs to compress and then pop the food particle or object cork-like out of the airway, where it had lodged. As soon as the rescue has been completed (successfully), the victim should see a physician.

30. This passage chiefly describes

- a. causes of food choking
- b. where to get information on the Heimlich Maneuver
- c. how to perform the Heimlich Maneuver
- d. how the Heimlich Maneuver was devised
- e. the six major causes of death in the U.S.

31. The main idea expressed in this selection is that

- a. death from food choking can occur within four minutes
- b. the Heimlich Maneuver is a relatively simple method for helping people who are choking on food
- c. the Heimlich Maneuver can be performed by a victim on himself
- d. choking on food is the sixth largest cause of accidental death in the U.S.
- e. although the Heimlich Maneuver has saved many lives, it also has been subject to criticism

32. The term diaphragm refers to

- a. a device for extracting food lodged in the throat
- b. food lodged in the victim's airway
- c. a muscle between the chest and abdomen
- d. a method for dislodging trapped food
- e. the part of the rescuer's arm used to press against the victim

They don't have to pay higher prices for fuel during the winter, but the creatures of the forest face their own energy crisis when the weather turns cold and snow falls.

As winter approaches, deer and elk are faced with reduced food supplies and even under ideal conditions the best they can hope for is a maintenance diet.

Animals, unlike humans, slow their metabolic rate in the winter; they become less excitable, and generally undergo a fairly drastic physiological change...limiting the need for food supplies.

Mule deer bucks lose up to 18 percent of their body weight during the "rut," or breeding period in late October. They enter the critical winter months already in need of food.

Does enter the winter usually healthier and with fat reserves — nature's way of protecting the unborn fawns — but their body processes are also slowed. Much of the energy stored by the does is used in development of the unborn fawn.

Generally, does and bucks come out of the winter in about the same shape, but for different reasons. The bucks were inactive when they entered the cold months after little eating and much breeding. The does have been "feeding" two creatures, but started in better shape.

Like humans, deer and elk seek shelter from the winter winds and snow. They prefer thick brush, fir stands, and protected valleys in order to "conserve energy."

33. This passage chiefly discusses the effect on deer and elk of
- unborn fawns
 - reduced food supply
 - lack of shelter
 - an unsuccessful breeding season
 - careless human beings
34. The term "metabolic rate" used in this passage refers to the rate of
- breeding
 - weight loss
 - newborn development
 - body processes
 - onset of winter

35. Which title best states the main idea of this passage?

- a. Dogs - the Healthier of the Species
- b. Nature's Answer to the Energy Crisis
- c. Nature's Protection of the Unborn
- d. Breeding and Weight Loss
- e. Shelter from the Snow

LIFE EXPECTANCY AND CIGARETTE SMOKING

Cigarette smoking is obviously associated with life expectancy. A study done in 1967 shows that important differences exist between the expectancies of smokers and nonsmokers and also between the expectancies of heavy smokers and light smokers. The chart below shows the results of that study.

LIFE EXPECTANCY (YEARS) AT VARIOUS AGES
ESTIMATE FOR UNITED STATES MALES

Age	Cigarette Smokers By Daily Amount			
	Never Smoked Regularly	1-9	10-19	20-39
25	48.3	44.6	44.1	43.4
30	43.3	38.3	38.2	37.8
35	38.3	34.7	35.3	35.3
40	34.3	30.3	30.8	30.7
45	30.3	26.8	26.8	26.4
50	26.3	23.3	23.3	23.3
55	22.3	19.3	19.4	19.3
60	17.3	14.3	14.1	13.7
65	14.1	11.3	11.2	10.7

36. A 30-year-old male who smokes 10-19 cigarettes a-day can expect to live this many years longer:

- a. 31.1
- b. 33.8
- c. 39.3
- d. 38.4
- e. 45.0

MOLECULAR FORMULAS

Molecular formulas show us what atoms are present in each molecule of a compound; the numbers show how many atoms of a given element are present in each molecule. If there is no number after the atomic symbol, it means that only one atom is present.

Notice though, that if the formula were to read $2\text{H}_2\text{O}$, the notation would tell us that we were speaking of two water molecules containing four hydrogen atoms and two oxygen atoms. When a number *precedes* a molecular formula, it shows how many molecules of that particular kind are present.

The symbol representing an element is generally a capital letter. When more than one element has the same first letter (Hydrogen and Helium, for example), a capital and a small letter make up the symbol. These symbols are abbreviations of Latin names, thus some of them are different from English.

Examples of single-letter symbols are:

C = carbon H = hydrogen O = oxygen P = phosphorus

Two-letter symbols include:

Cl = chlorine He = helium Os = osmium Pu = plutonium

Abbreviations for Latin names include:

Fe (ferrum) = iron	Pb (plumbum) = lead
Na (natrium) = sodium	Ag (argentum) = silver
Au (aurum) = gold	K (kalium) = potassium

Through use, these symbols, particularly those in the last group, come to have meaning. In the fire service, "Purple K" is a dry chemical extinguisher, purple in color, made from a potassium (K) compound. NaK is a compound of sodium and potassium that reacts with water.

A good example of how we use symbols in other fields is the way we substitute "pound" in our minds when the sign reads "lb."

37. Elements have been given a two-letter symbol when
- the name comes from Latin
 - there are two atoms of the element present
 - the name comes from English
 - another element has the same first letter
 - there are two molecules present in the formula
38. The number after an atomic symbol refers to
- how many elements are in the molecule
 - how many atoms of the element are in the molecule
 - how many molecules are present
 - how much hydrogen is present in the formula
 - how much oxygen is present in the formula
39. How many molecules are represented here: $4\text{C}_6\text{H}_{12}\text{O}_6$?
- 96
 - 3
 - 4
 - 6
 - 24

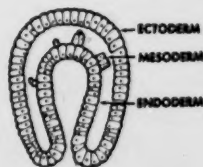
THE SIMPLE BEGINNINGS

During the first two weeks of human development, the cellular processes of growth — multiplication, movement, and differentiation — are at their simplest and most comprehensible. The multiplication begins almost at the moment of conception, and for the first few days is the only process in operation. Cells are reproduced in a geometric progression, one cell dividing into two, then two into four and so on. As the embryo grows, cell movement begins to organize the mass of cells, first into an irregular hollow ball, then into more elaborate shapes such as the embryonic disc, which sets the stage for the third process, differentiation. It is uncertain at just what point differentiation begins its irrevocable changes by which the cells are gradually modified for specific functions. But by the end of the second week, groups of cells have embarked on the different paths which will eventually result in the specializations necessary for the formation of the mature organism.

By the beginning of the third week, the embryonic disc has grown from two layers to three (see below). Each layer will develop into a different set of organs and tissues, though there are still no detectable differences among the cells.

Cells from the ectoderm form the body's outermost tissues, the epidermis, hair, and nails. But some will develop into the brain and the rest of the nervous system.

The group of cells from the mesoderm develop into the skeleton and bone marrow, the muscles, heart, and blood corpuscles, and also form the inner skin layer, the blood vessels, kidneys, and gonads.



The cells from the endoderm form the linings of nearly all the internal organs, including the lungs, trachea, and pharynx, and digestive tract including the pancreas and liver.

40. The illustration provided emphasizes the aspect of development called
- progression
 - multiplication
 - conception
 - differentiation
 - elaboration
41. It can be inferred from this passage that
- the most important part of human development occurs during the first two weeks
 - the point at which differentiation begins can be precisely determined
 - the endoderm is the most crucial layer of the embryonic disc
 - human development begins approximately two weeks after conception
 - human development is initially a process of cell division
42. The prefix *meso* — most nearly means
- marrow
 - layer
 - middle
 - cell
 - group
43. Which statement best describes the main idea as stated in this passage?
- Differentiation is an irrevocable process.
 - Each layer of the embryonic disc develops into a different set of organs and tissues.
 - The human embryo develops as a result of the three cellular processes of growth.
 - Cells are reproduced in geometric progression.
 - The same group of cells produces the skeleton, muscles, and heart.

EPA FUEL ECONOMY TESTS

	Engine size in cubic in.	Cylinders	Trans- mission M - Manual A - Automatic	MILES PER GALLON		
				City	High- way	Com- bined
Mini-compact						
Highest Mileage						
Datsun B-210	85	4	M	36	48	40
Dodge Colt	98	4	M	34	45	38
Plymouth Lancer	98	4	M	34	45	38
Subaru	97	4	M	31	46	37
Dodge Celeste	98	4	M	29	39	33
Lowest Mileage						
Fiat 128	79	4	M	20	31	23
Ford Pinto	171	6	A	18	22	20
Lincoln-Mercury Bobcat	171	6	A	18	22	20
Mazda RX-3 (Rotary)	70	2	A	18	23	20
Ford Mustang II	171	6	A	18	20	18
Sub-compact						
Highest Mileage						
Volkswagen Rabbit (Diesel)	90	4	M	40	53	45
Toyota Corolla	71	4	M	34	46	39
Ford Fiesta	98	4	M	34	46	38
Mazda GLC	78	4	M	35	44	38
Chevrolet Chevette	98	4	M	30	40	34
Lowest Mileage						
Fiat Lancia Beta	107	4	A	17	20	18
Oldsmobile Starfire	305	8	M	16	22	18
BMW 530i	182	6	M	14	24	17
Chevrolet Camaro	350	8	M	14	19	16
Pontiac Firebird	400	8	M	12	16	14
Compacts						
Highest Mileage						
Peugeot 504 (Diesel)	141	4	M	28	34	30
Dodge Aspen	225	6	A	20	27	23
Plymouth Volare	225	6	A	20	27	23
Pontiac Phoenix	151	4	A	21	27	23
AMC Concord	232	6	M	19	26	22
Compacts						
Lowest Mileage						
Pontiac Phoenix	305	8	M	15	21	17
AMC Pacer	304	8	A	14	19	16
Cadillac Seville	350	8	A	14	20	16
Dodge Aspen	380	8	A	10	17	13
Plymouth Volare	380	8	A	10	17	13

44. According to this chart, the sub-compact with the poorest mileage results for highway driving is

- Ford Mustang II
- Pontiac Firebird
- Chevrolet Chevette
- Plymouth Volare
- AMC Concord

45. If you wanted a 4 cylinder car with automatic transmission and highest gas mileage, your best choice would probably be

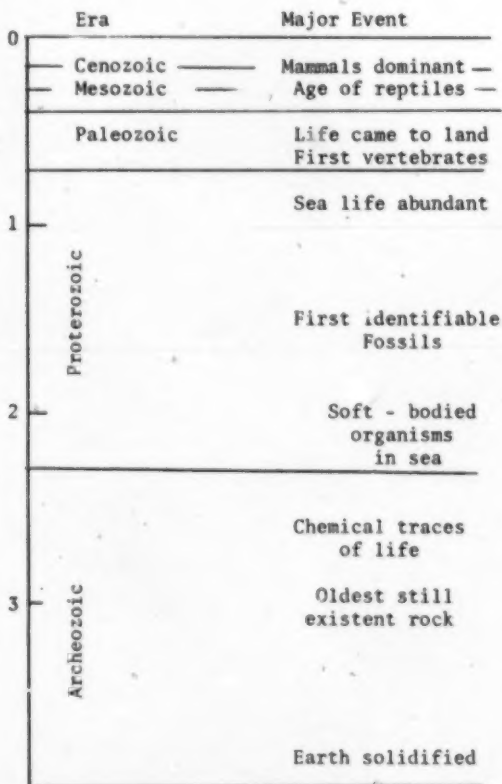
- Pontiac Phoenix
- Ford Pinto
- Datsun B-210
- Dodge Aspen
- Volkswagen Rabbit (diesel)

46. The best combined mileage for an 8-cylinder sub-compact car is found in

- Pontiac Phoenix
- Volkswagen Rabbit
- Chevrolet Camaro
- Oldsmobile Starfire
- Peugeot 504 (diesel)

THE TIME SCALE OF GEOLOGICAL HISTORY

The following chart shows the chronological development of a few of the major events in the evolution of living things.



47. Sea life became abundant

- a. less than 1 billion years ago
- b. slightly more than 1 billion years ago
- c. in the Cenozoic Era
- d. during the age of reptiles
- e. before the first-identifiable fossils existed

48. According to this diagram

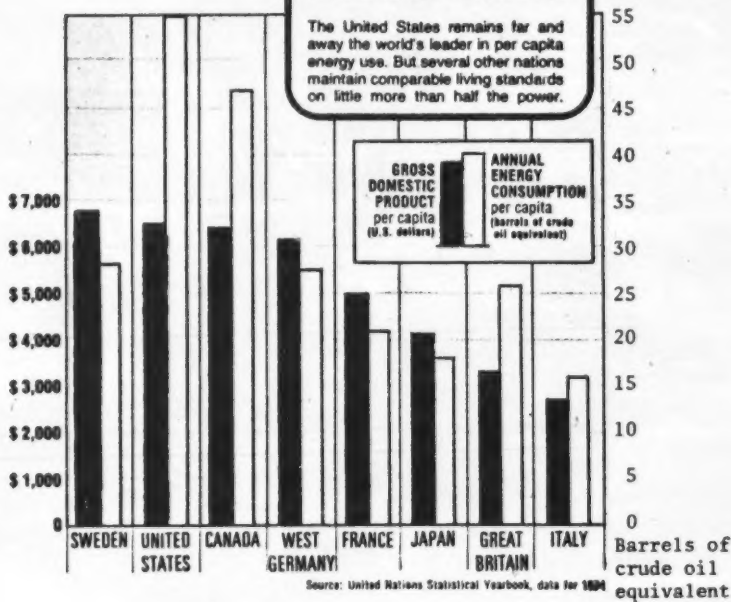
- a. mammals have always dominated geological history
- b. fossils predate the oldest rocks still existing
- c. geological changes have occurred rapidly
- d. the age of reptiles was a relatively brief era
- e. the Paleozoic Era was characterized by a lack of life on land

49. According to this diagram, all of the following statements are true except:

- a. The Proterozoic Era was a time when sea life dominated the earth.
- b. The first identifiable fossils appeared about 2 billion years ago.
- c. Each era covered approximately one billion years.
- d. The Cenozoic Era is the era when mammals became dominant.
- e. The first vertebrates appeared at relatively the same time period as when life came to land.

THE WASTE LAND

The United States remains far and away the world's leader in per capita energy use. But several other nations maintain comparable living standards on little more than half the power.



50. A country whose annual energy consumption is nearly that of Sweden's is

- a. Canada
- b. Japan
- c. France
- d. West Germany
- e. United States

51. Standard of living is identified in this graph as

- a. barrels of oil sold to other countries
- b. gross domestic product
- c. type of government
- d. annual energy consumption
- e. population growth

52. The country that is able to maintain about the same standard of living as the U.S. while using far less energy is

- a. Japan
- b. Italy
- c. Sweden
- d. France
- e. Great Britain